skoflo
Industries

Surface CIMV, Low Flow, HTV, Manual
10,000 psi

SF10000HTVA-MA

Operations and
Maintenance Manual

DOC-03751 Rev B

Pioneering an Industry

Table of Contents

Table of Figures

Table of Tables

About SkoFlo

Our experience and track record speak for themselves. SkoFlo has delivered over 20,000 valves since 1988. We are the only company that proves our products by testing in surface applications before deploying them subsea. The result is that SkoFlo products have amassed over 25 million continuous operating hours. This level of experience is unparalleled and provides the basis for being the solution provider to our served market.

General Information

Product Overview

The SF10000HTVA is a pressure independent chemical injection and metering valve (CIMV), used in the petroleum industry to accurately control chemical injection rates. The SF10000HTVA regulates flow to counter pressure changes on the inlet and outlet of the unit. This is referred to as "pressure independence".

The SF10000HTVA utilizes Skoflo's HPS (High Pressure Stage) technology to prevent cavitation and erosion at high pressure drops, thereby, increasing the valve's reliability and maintenance interval.

Pressure Independence

SkoFlo defines pressure independence as the percent (%) of reading change for each 1,000 psi (69 bar) change in supply or outlet pressure.

Pressure independence in the SF10000HTVA is a completely mechanical process, requiring zero power.

The principle of pressure independence is that the valve maintains a constant differential pressure (dP) across an internal orifice (the 'gate'), thus resulting in a constant flow rate through that orifice.

The pressure that is generated by flow through the gate is applied to either side of a spring balanced piston that carries a regulating pin. The piston will travel to a position where the spring force equals the pressure force.

Minimum Differential Pressure

For the SF10000HTVA to provide pressure independent performance, a minimum differential pressure (min dP) is required across the valve to allow the spring-balanced piston to move to a truly balanced location.

In general, higher flows and/or viscosities require a higher min dP across the valve. Refer to the product datasheet for specific information.

Guidelines for Using this Manual

The following instructions are provided to ensure a safe and proper installation and operation.

- Read all instructions prior to installation and operation of this product.
- Follow all warning and caution notes.
- Install this product as specified in the instructions provided by SkoFlo.
- Prior to use, educate personnel in the proper installation, operation, and maintenance of this product.
- Only use replacement parts specified by SkoFlo.

Warning, Caution, Notice

Throughout this manual there are steps and procedures which, if not followed, may result in a hazard. The following flags are used to identify the level of potential hazard.

! WARNING

WARNING IS USED TO INDICATE THE PRESENCE OF A HAZARD WHICH CAN CAUSE SEVERE INJURY, DEATH, OR SUBSTANTIAL PROPERTY DAMAGE IF THE WARNING IS IGNORED.

! CAUTION

CAUTION IS USED TO INDICATE THE PRESENCE OF A HAZARD WHICH CAN CAUSE INJURY OR PROPERTY DAMAGE IF THE WARNING IS IGNORED.

! NOTICE

NOTICE IS USED TO NOTIFY PEOPLE OF INSTALLATION, OPERATION, OR MAINTENANCE INFORMATION, WHICH IS IMPORTANT BUT NOT HAZARD RELATED.

Abbreviations and Acronyms

CIMV	Chemical Injection and Metering Valve
HPS	High Pressure Stage
dP	Differential Pressure
GA	General Arrangement
HTV	High Turn-Down Valve
SHCS	Socket Head Cap Screw

Hydraulic Ratings

! WARNING

REFER TO THE GENERAL SECTION OF THE PRODUCT DATASHEET FOR DESIGN PRESSURE DETAILS.

! NOTICE

THE SF10000HTVA REQUIRES A MINIMUM DIFFERENTIAL PRESSURE ACROSS THE VALVE OF 300 PSI (20.7 BAR) TO ACHIEVE FULL RATED FLOW.

! CAUTION

THE SF10000HTVA CAN GET HOT AT HIGH FLOW RATES AND PRESSURE DROPS. USE THE FORMULA BELOW TO CALCULATE THE FLUID TEMPERATURE RISE.

Max Working Pressure: 10,000 psi (690 bar)

Hydro-Pressure: 15,000 psi (1034 bar)

Flow Ranges:

- 1 to 600 GPD (0.16 to 94 LPH)
- 50 to 2500 GPD (7.8 to 394 LPH)

Min Differential Pressure: 300 psi

$$Temp.Rise\ (°F) = \frac{0.003 \times Differential\ Pressure}{Specific\ Gravity \times Specific\ Heat}$$

Storage

! NOTICE

IT IS RECOMMENDED TO STORE THE ASSEMBLIES IN THE SHIPPING CRATE, IF POSSIBLE.

The SF10000HTVA should be stored in a shelter and be protected from moisture and particulates. Storage temperatures shall be between –50°F and 158°F (–45°C and 70°C).

Any open hydraulic connections will be furnished with plastic blanking plugs.

It is important not to store the SF10000HTVA with production chemicals in the unit. These chemicals can settle, possibly resulting in damage to the unit. SkoFlo recommends that the valve be stored with a mixture of glycol in water as the preservation fluid.

Installation

! WARNING

CHEMICAL COMPATIBILITY SHALL BE DONE AND CHECKED BEFORE USE, EXCEPT FOR MEG AND WATER MIXTURES.

! WARNING

THE SF10000HTVA SHALL NOT BE INSTALLED SUBSEA.

1. Mounting

The SF10000HTVA can be panel or base mounted in any orientation. See Appendix B for more details.

If panel mounting, unscrew the handle fastener with a 2mm Allen wrench and remove the handle. Mount the valve, then replace the handle and tighten the fastener in place.

The base plate can be rotated in 90-degree increments to offer various inlet/outlet configurations:

1.1 Loosen and remove the eight M12 socket head cap screws (SHCSs) attaching the base.

1.2 Rotate the base to the desired orientation.

1.3 Replace the four fasteners and tighten in opposite pairs to 45 ft.lbf [61 Nm].

2. Hydraulic Installation

Install the SF10000HTVA so that the flow is in the proper direction. The IN (inlet) and OUT (outlet) connections are marked respectively. See Appendix B for details.

Install an inline filter upstream of the SF10000HTVA. Clean chemicals and proper filtering are very important. Omitting the filter can cause the valve to become plugged. Table 1 lists the filter requirements for the various flow ranges. Note: if coarser filters are used, the adjustment handle may need to be periodically opened to flush out any debris.

Table 1 – Filter Specification

Flow Range	Filter Micron Size
0.6 to 10 GPD	40
10 to 700 GPD	80
> 700 GPD	200

A pulsation dampener is recommended to be installed on the inlet header supplying the SF10000HTVA for improved longevity and set point consistency. A bladder type pulsation dampener is preferred over a piston type. Reactive dampeners that use baffles will do little to dampen the pressure over the full flow range of the valve.

The SF10000HTVA is not a positive shut off device, therefore, a valve on the inlet or outlet will be required to meet shut off specifications. The preferred location of the shut off valve is on the outlet of the SkoFlo valve to minimize the shock to internal parts during start up.

A check valve shall be installed immediately downstream of the SF10000HTVA (within 6 inches) to prevent damage to the piston cup seal and to prevent well fluids entering the valve. The 6-inch maximum is required to eliminate stored pressure build up during startup. Check valve cracking pressure is recommended to be under 10 psi to enhance longevity of check valve seats.

An example of a typical chemical injection system is given in Appendix A.

3. Start Up Procedures

3.1 Open the supply isolation valve to the SkoFlo valve slowly (> 1 second). This will allow pressures within the unit to equalize slowly, the valve will stabilize quickly.

3.2 Turn the rate adjustment handle clockwise until you are at the desired flow rate.

3.3 Always start at a flow rate above the desired flow and decrease to the desired setting (turn handle clockwise to decrease flow rate).

– For the most consistent set point results, rotate handle ½ turn clockwise to reach the set point.

3.4 The flow controller is now set, and further adjustments are not required.

Operation

4. Adjustment and Calibration

The SF10000HTVA is a pressure independent flow control device. Once the valve is set at a desired flow rate, that flow rate is maintained even though the pressure conditions upstream and/or downstream of the valve may change considerably.

The flow rate can be set using an inline flow meter, such as the SkoFlo SF10000PDFMA, however, it must be capable of withstanding the process pressure. Another method of calibrating the SF10000HTVA is with a 3-way valve and a line to a calibration beaker. Once the flow rate is set, the 3-way valve is switched to direct the chemical to the process (see Figure 1).

Since the SkoFlo valve regulates the flow independent of the pressure differential across it, the flow rate to the process is the same as the flow rate set using the beaker. Overall monitoring of the flow is done by taking inventory of the usage from the supply tank.

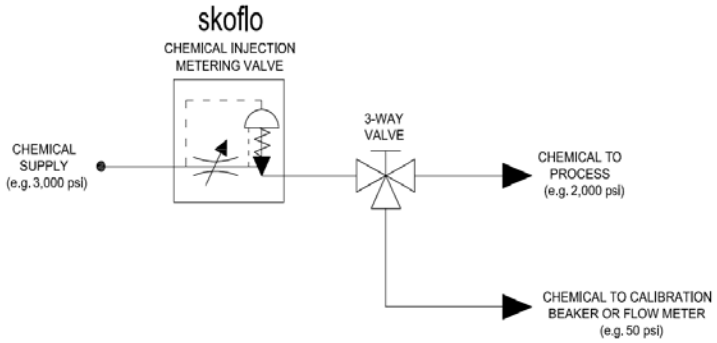


Figure 1 – Valve Calibration Schematic

5. Valve Flushing

The small flow passages within the SF10000HTVA can become clogged if insufficient filtration is used. To flush the valve, turn the handle counter-clockwise unit you reach the top stop. Let the valve flow for 30 seconds before returning it to the set point. For best results, apply a 1,500psi drop across the valve during the flushing process.

Maintenance

Spares kits available for typical maintenance items are listed in Table 2.

Table 2 – SF10000HTV Spares Kit Part Numbers

ITEM	FFKM	FKM	EPDM
Seal Kit	30974	30975	30976
0.6-700 GPD Stem Assembly Kit	30632	30633	30634
50 -2500 GPD Stem Assembly Kit	30845	30846	30847
Piston Assembly Kit	30977		
HPS Assembly Kit	30978		
Gate Pad	30512		
Washer Spring Stack	30513		
O-ring installation Tool Kit	30641		

Table 3 – Maintenance Tool Requirements

Tools and Parts	Quantity
Vise	1
250 ft.lb [340 Nm] Torque wrench	1
50 ft.lb [68 Nm] Torque wrench	1
7/8" Wrench	1
24mm socket	1
22mm socket	1
13mm deep socket	1
12mm socket	1
10mm Allen socket	1
Pliers	1
2mm Allen wrench	1
Circlip Pliers (.035" Tip Diameter)	1
HTVA O-Ring Installation Kit (P/N: 30641)	1
Selection of picks and brass rods	1
Parker Super Lube (or equivalent)	1
Dynatex Anti-Seize & Lubricating Compound (or equivalent)	1

6. Replacing the Gate Pad Assembly

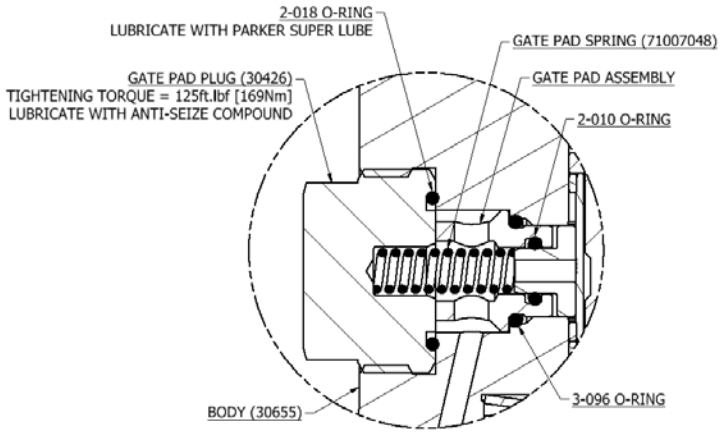


Figure 2 – Gate Pad Assembly Cross Section

6.1 Remove the valve from the system.

6.2 Secure the valve in a vise.

6.3 Unscrew the gate pad plug (30426) – *22mm socket.*

6.4 Remove the spring (71007048) and old gate pad assembly – *A brass rod can be used to aid pad assembly removal.*

Figure 3 – Gate Pad Assembly Removal

6.5 Insert the replacement gate pad assembly followed by the spring (71007048).

6.6 Lubricate the gate pad plug O-ring with Parker Super Lube and the gate pad plug thread with Dynatex Anti-Seize & Lubricating Compound.

6.7 Screw the gate pad plug (30426) into the body. Torque to 125 ft.lbf [169 Nm] – *22mm socket, torque wrench.*

7. Replacing the Stem Assembly

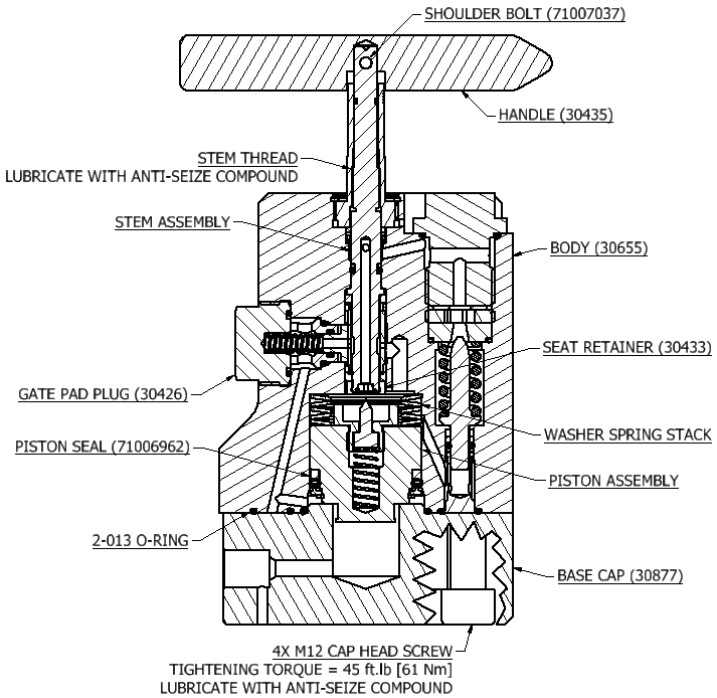


Figure 4 – SF10000HTVA Cross-Section

! NOTICE

IT IS CRITICAL THAT THE GATE PAD IS REMOVED BEFORE THE STEM. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE GATE GUIDE RINGS.

7.1 Remove the valve from the system.

7.2 Secure the valve in a vise.

7.3 Unscrew the gate pad plug (30426) – *22mm socket*.

7.4 Remove the spring (71007048) and pad assembly – *A brass rod can be used to aid pad assembly removal.*

7.5 Remove the base cap – *10mm Allen socket*.

7.6 Remove the piston assembly and washer spring stack – *Pliers*.

Figure 5 – Piston Assembly Removal

7.7 Rotate the handle clockwise until you reach the bottom stop.

7.8 Unscrew the handle fastener (71007037) and remove the handle (30453) from the stem – *2mm Allen wrench*.

7.9 Place a 12mm socket over the seat retainer (30433) and rotate counter-clockwise until you can withdraw the old stem assembly from the body – *12mm socket.*

Figure 6 – Stem Assembly Removal

7.10 Lubricate the O-rings on the replacement stem assembly with a thin coat of Parker Super Lube and the stem thread with a generous coating of Dynatex Anti-Seize & Lubricating Compound.

7.11 Insert the replacement stem assembly into the body.

7.12 Rotate the stem until the gate profile is visible through the gate pad hole. See Figure 7 for more details.

Figure 7 – Gate View Through Gate Pad Hole

7.13 Place your finger on the gate (through the gate pad hole) to prevent the gate from rotating. Place a 12mm socket over the seat retainer (30433) and rotate clockwise until you reach the top stop – *12mm socket, socket extension*.

7.14 Ensure the gate profile is still visible through the gate pad hole.

7.15 Insert the gate pad assembly and spring.

7.16 Lubricate the gate pad plug O-ring with Parker Super Lube and the gate pad plug thread with Dynatex Anti-Seize & Lubricating Compound.

7.17 Screw the gate pad plug (30426) into the body. Torque to 125 ft.lbf [169 Nm] – *22mm socket, torque wrench*.

7.18 Insert the Belleville spring stack (30513) into the valve. The springs should be assembled as shown in Figure 9 with the outside edge contacting the bottom of the piston bore.

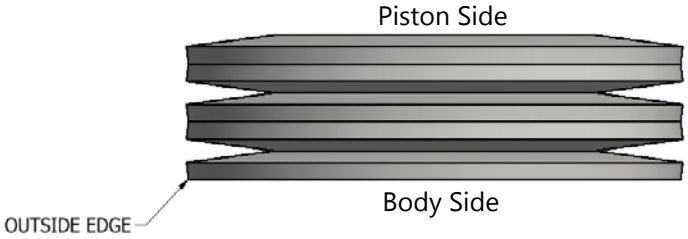


Figure 8 – Spring Stack Arrangement

7.19 Lubricate the piston cup seal (71006962) with Parker Super Lube.

7.20 Insert the piston assembly into the valve bore. Apply gentle pressure until the piston seats against the springs.

7.21 Coat the base fasteners (71006909) with a thin coat of Dynatex Anti-Seize & Lubricating Compound.

7.22 Install the base and tighten the eight M12 cap head screws. The fasteners should be tightened in opposite pairs to 50 ft.lbf [68 Nm] – *10mm Allen socket, torque wrench*.

7.23 Place the handle (30435) on the stem and align the holes.

7.24 Insert the handle fastener (71007037) and tighten – *2mm Allen wrench*.

8. Replacing Stem Seals

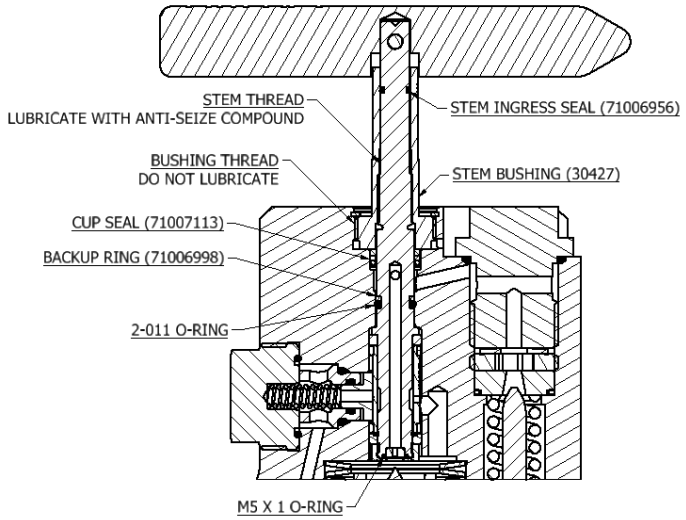


Figure 9 – Stem Seal Cross Section

! NOTICE

IT IS CRITICAL THAT THE GATE PAD IS REMOVED BEFORE THE STEM. FAILURE TO DO SO WILL RESULT IN DAMAGE TO THE STEM GUIDE RINGS.

8.1 When replacing stem seals, it is recommended that the O-Ring Installation Kit (P/N: 30641) be used.

8.2 Remove the SkoFlo valve from the system.

8.3 Follow steps 7.2 to 7.9 to remove the stem assembly from the valve.

8.4 Remove the spiral wound ring (71007136) that retains the stem bushing (30427) – *Circlip pliers (.035" Tip Diameter)*.

8.5 Unscrew the stem bushing (30427) – *13mm deep socket*.

8.6 Remove old stem seals and backup rings from the body and stem, taking care not to scratch any of the sealing surfaces.

8.7 Install O-ring guide tool (30642) as shown in Figure 10.

Figure 10 – Stem O-ring Installation Tool

8.8 Lubricate new O-rings with Parker Super Lube.

8.9 Slide a new 2-011 O-ring followed by the new backup ring (71006998) over O-ring installation tool (the backup ring should be on the handle side of the O-ring) as shown in Figure 11.

8.10 Remove the O-ring installation tool.

Figure 11 – Stem O-ring and Backup Ring

8.11 Install stem ingress seal (71006956).

8.12 Apply a generous coat of Dynatex Anti-Seize & Lubricating Compound to the stem thread.

8.13 Insert the stem assembly into the valve body. Press firmly to ensure the stem is fully home.

8.14 Make sure the gate profile is visible through the gate pad hole.

8.15 Drop the cup seal assembly (71007113) over the stem. See Figure 12 for orientation details.

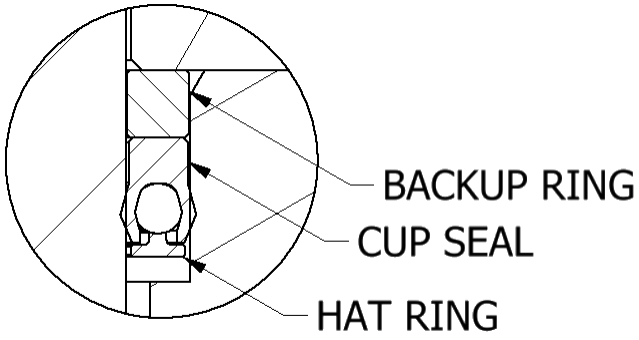


Figure 12 – Stem Seal Arrangement

8.16 While holding the stem in place from below, drop the press tool (30643) over the stem and screw it down by hand, taking care not to cut the cup seal. If the tool will not bottom out by hand, use a wrench to press the seal into the groove.

Figure 13 – Pressing Stem Seal into Groove

8.17 Unscrew the press tool (30643) and check that the seal is fully inserted in the body and that there are no signs of damage to the cup seal or backup ring.

8.18 Screw the stem bushing into the valve body (do not apply any lubricant to the bushing thread), making sure the gate does not rotate as you do so. Torque to 37 ft.lbf [50 Nm] – *Torque wrench, 13mm deep socket.*

8.19 Reinstall the retaining ring (71007136) – *Circlip pliers (.035" Tip Diameter)*.

! WARNING

THE RETAINING RING MUST BE REINSTALLED TO PREVENT THE STEM BUSHING FROM BACKING OUT, WHICH COULD LEAD TO A HIGH-PRESSURE LEAK.

8.20 Follow steps 7.14 to 7.24 to reassemble the rest of the valve.

9. Replacing HPS Seals

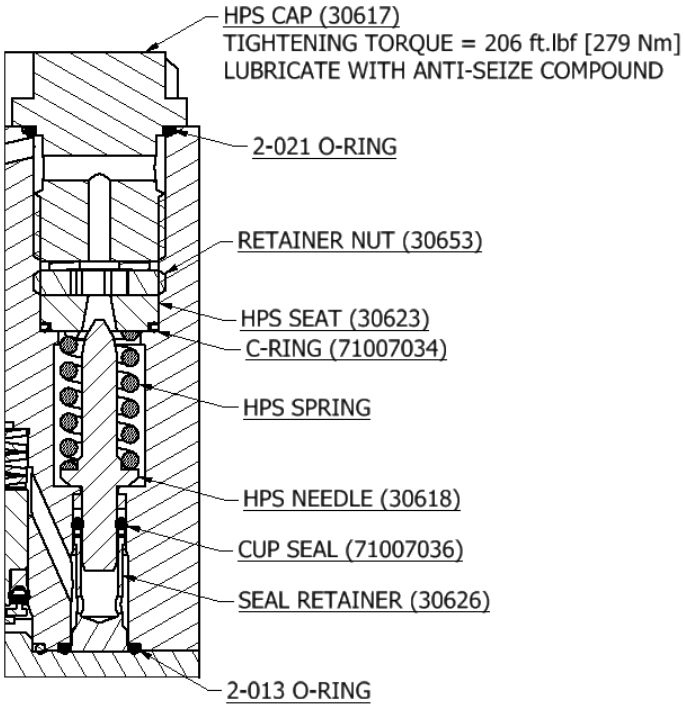


Figure 14 – HPS Seal Arrangement

9.1 Remove the valve from the system.

9.2 Secure the valve in a vise.

9.3 Remove the base cap – *10mm Allen socket*.

9.4 Remove the 2-013 O-ring and seal retainer (30626).

9.5 Unscrew the HPS cap (30617) – *24mm Socket*.

9.6 Remove the spring washer and unscrew the retainer nut (30653) – *10mm Allen socket*.

9.7 Working in a circular motion, remove the HPS seat (30623) from the body – *Small Pick*.

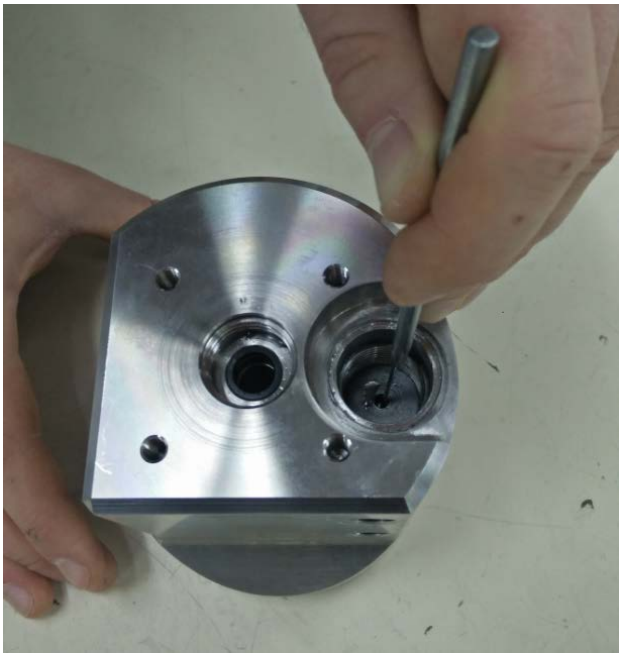


Figure 15 – Removing the HPS Seat

9.8 Upend the valve, remove the HPS spring and push on the backside of the HPS needle (30618) releasing it from the cup seal – *Brass Rod*

9.9 Drop the needle back into the body and use it to push out the old cup seal (71007036).

9.10 Remove the needle.

9.11 Place the new cup seal assembly (71007036) over a rod to ensure the correct arrangement and drop into the body. See Figure 16 for orientation details.

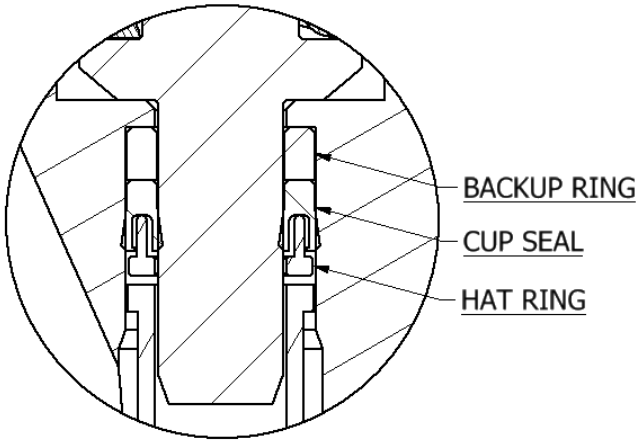


Figure 16 – HPS Seal Arrangement

9.12 Push the cup seal assembly into its groove with the seal retainer (30626).

9.13 Replace the 2-013 O-ring.

9.14 Install the base and tighten the eight M12 cap head screws. The fasteners should be tightened in opposite pairs to 45 ft.lbf [61 Nm] – *10mm Allen socket, torque wrench.*

9.15 Drop the HPS needle (30618) into the body and carefully push home – *Brass Rod.*

9.16 Drop the HPS spring over the needle.

9.17 Replace the C-ring (71007034) on the HPS seat. Use a drop of O-ring lube to hold the seal in place during assembly.

Figure 17 – HPS Seat and C-Ring

9.18 Drop the seat into the body and work into position – *Brass Rod.*

Figure 18 – Installing HPS Seat

9.19 Replace the retaining nut (30653) and torque to 30 ft.lbf [40 Nm] – *10mm Allen socket, torque wrench.*

9.20 Drop the washer spring (71007029) on top of the retaining nut.

9.21 Replace the HPS cap (30617) and torque to 206 ft.lbf [279 Nm] – *24mm socket, torque wrench*

Frequently Asked Questions

Table 4 – Frequently Asked Questions

ALL CIMVs	
Question	**Answer**
CIMV Shutoff Ability	SkoFlo CIMVs are not shut off devices. Separate isolation valves should be used for shutting off the flow.
Protection Against Reverse Flow	A check valve shall be installed immediately downstream of the valve (within 6 inches) to prevent seal damage.
Minimum Differential Pressure to Operate	See CIMV specification sheet that was supplied with the CIMV to determine minimum required pressure drop.
Excessive Pressure Drop	See CIMV specification sheet that was supplied with the CIMV to determine maximum pressure drop.
Fluid Cavitation	Fluid cavitation occurs primarily when CIMV pressures (and secondarily fluid viscosity and velocity) cause a drop below the fluid vapor pressure. When the SkoFlo CIMV enters its cavitation region, energy release from vapor compression at the pin/seat interface may cause premature wear.
Chemical Filming	Historically, chemical filming has not been experienced in SkoFlo HTD/HTV models. Chemical filming is dependent on chemical composition selection by the user. Injected chemicals would need to have an affinity to ceramic to film. Currently, there are no known chemicals that have this affinity.
Blowout Proof Stem	The stem design is blowout proof.

TROUBLESHOOTING

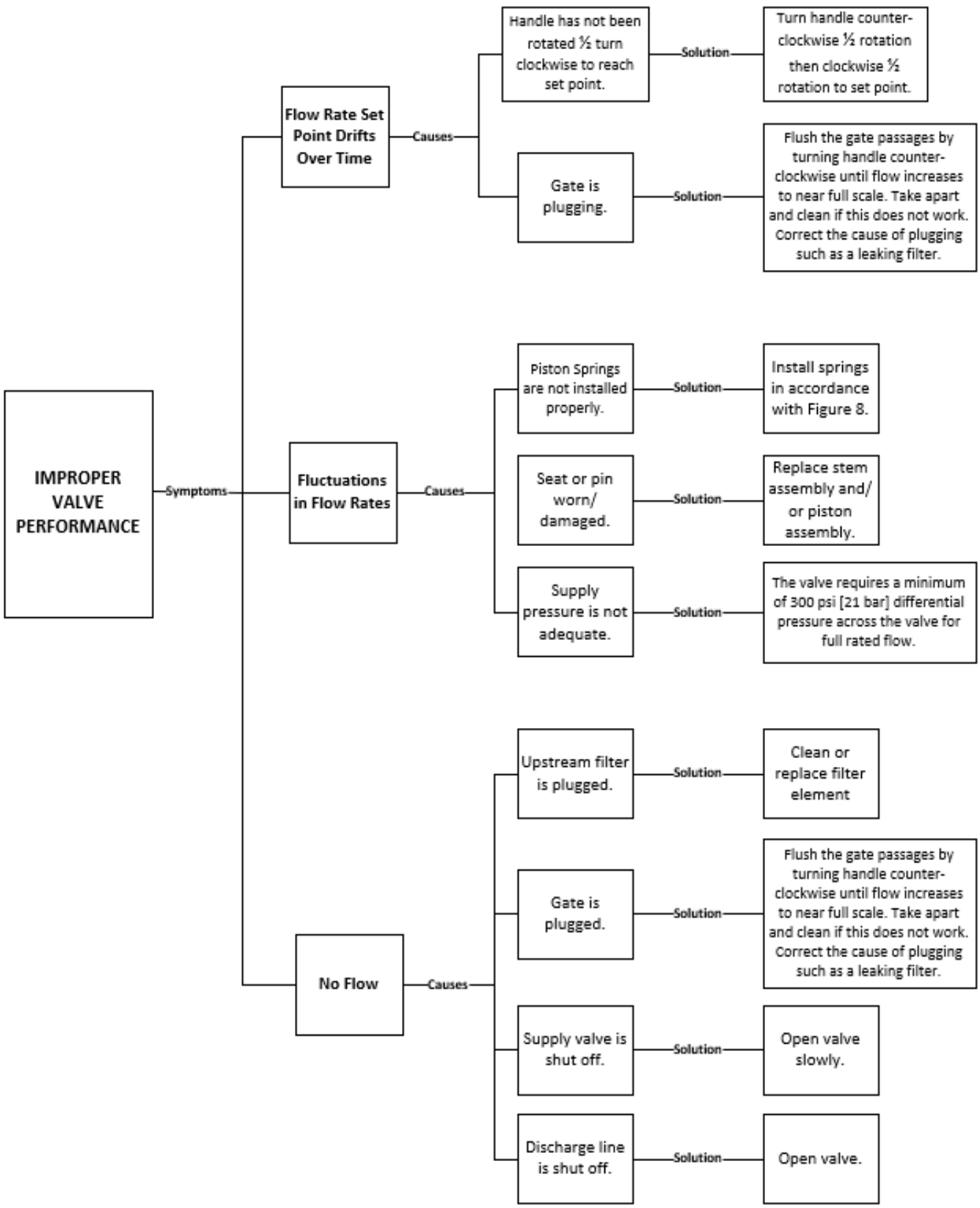
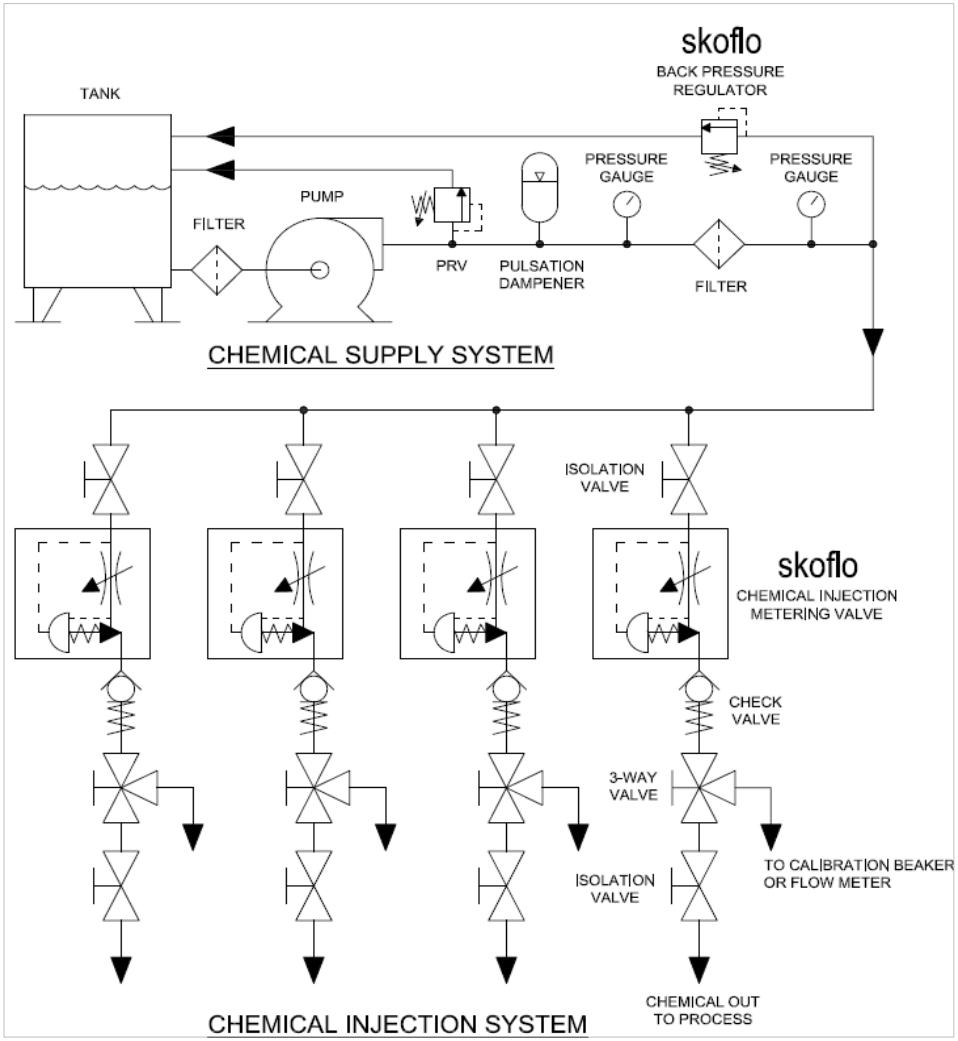


Figure 19 – Troubleshooting

APPENDIX A – A TYPICAL CHEMICAL INJECTION SYSTEM

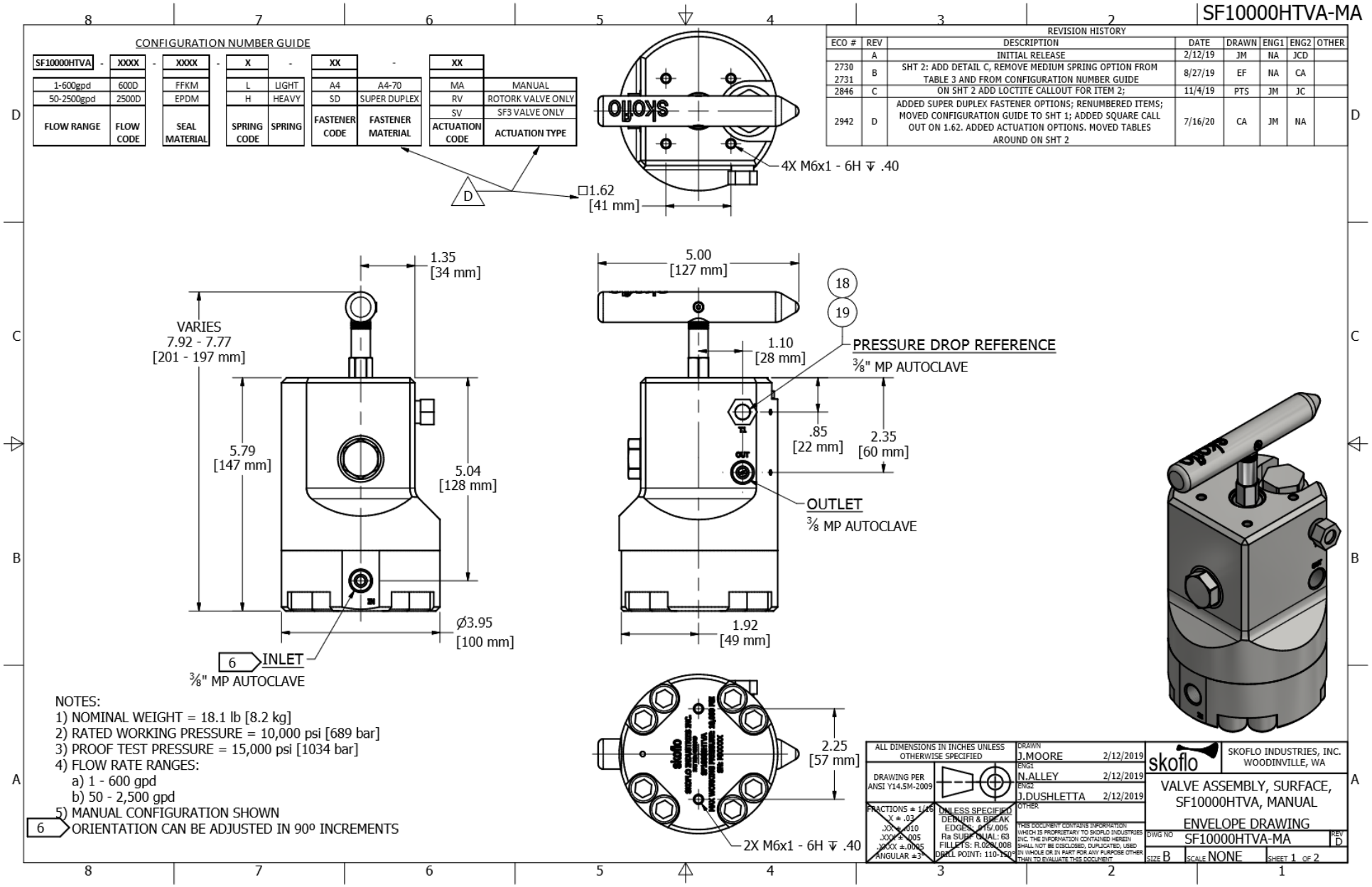


NOTES

Any number of injection points can be served by a single pump and header system. The only limitation is the flow capability of the pump.

Check valve shall be installed within 6 inches of the SkoFlo CIMV.

APPENDIX B – SF10000HTVA GA & BOM DRAWING



SF10000HTVA-MA

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	PRESSURE CONTAINING
1	1	30426	PLUG, GATE PAD, SURFACE HTV	NITRONIC 50 HS	YES
2	2	30431	GUIDE RING, GATE, SURFACE HTV	PEEK	NO
3	1	30432	GUIDE RING, STEM, TOP, SURFACE HTV	PTFE	NO
4	1	30433	RETAINER, SEAT, SURFACE HTV	316 SS	NO
5	1	30471	PIN, CERAMIC, .165	ZIRCONIA 3Y-TZP	NO
6	1	30512	PAD, GATE, SURFACE HTV	ZIRCONIA 3Y-TZP	NO
7	1	30513	SPRING, WASHER, STACK 5	INCONEL 718	NO
8	1	30617	CAP, HPS	NITRONIC 50 HS	YES
9	1	30618	NEEDLE, LF, HPS, 20°	CARBIDE BC-6N	NO
10	1	30623	SEAT, Ø.250, HPS	CARBIDE BC-6N	NO
11	1	30626	RETAINER, SEAL, HPS/ HTV	316 SS	NO
12	1	30653	NUT, RETAINER, SEAT, HPS	316 SS	NO
13	1	30655	BODY, 10KSI, SURFACE HTV	NITRONIC 50 HS	YES
14	1	30869	RETAINER, SEAL, GATE PAD, HTV	316 SS	NO
15	1	30877	BASE, SERIALIZED, 10KSI, HTV	NITRONIC 50 HS	YES
16	1	30954	PISTON, STOP VERSION, HTV	NITRONIC 50 HS	NO
17	1	71001948	SPIRAL RING, WST-118-S16	316 SS	NO
18	1	71002083	PLUG, 3/8 AE	316 SS	YES
19	1	71003288	NUT, PLUG, 3/8 AUTOCLAVE	316 SS	YES
20	1	71006907	SPRING, COIL, Ø.258 X 1.02, PISTON	ELGILOY	NO
21	1	71006956	SL, O-RING, 1.2mm CS X 6mm ID	EPDM	NO
22	1	71006962	SL, CUP, PISTON, HTD	SEE DWG 71006962	NO
23	1	71006998	SL, BU RING, .304 ID X .053W X .050T	PTFE	NO
24	1	71007029	SPRING, WASHER, Ø.845 X Ø.280 X .05	INCONEL 718	NO
25	1	71007034	SL, C-RING, EXTERNAL PRESSURE, ECE-000711-05-14-8-SPC	INCONEL 718	NO
26	1	71007036	SL, CUP, CANT SPRING, Ø.250 ID, FC1N1229	SEE DWG 71007036	NO
27	1	71007048	SPRING, COIL, Ø.250 X 1.00, GATE PAD	ELGILOY	NO
28	1	71007113	SL, CUP, .408 ID, FS032029-2	SEE DWG 71007113	YES
29	1	71007136	SLRG, INTERNAL, Ø.875, FHL-94-HAS	HASTELLOY C-276	NO
30	1	71007137	SLRG, EXTERNAL, .375, WSM-37-S16	316 SS	NO
31	1	SEE TABLE 1	SL, O-RING, 2-010	SEE TABLE 1	NO
32	1	SEE TABLE 1	SL, O-RING, 2-011	SEE TABLE 1	NO
33	2	SEE TABLE 1	SL, O RING, 2-013	FFKM	YES
34	1	SEE TABLE 1	SL, O-RING, 2-018	SEE TABLE 1	YES
35	1	SEE TABLE 1	SL, O-RING, 2-021	SEE TABLE 1	YES
36	1	SEE TABLE 1	SL, O-RING, 2-030	SEE TABLE 1	YES
37	1	SEE TABLE 1	SL, ORING, 3-906	SEE TABLE 1	NO
38	1	SEE TABLE 1	SL, O-RING, M5 X 1	SEE TABLE 1	NO
39	1	SEE TABLE 2	STEM, SURFACE HTV	NITRONIC 50 HS	YES
40	1	SEE TABLE 2	GATE, COATED, SURFACE HTV	NITRONIC 50 HS	NO
41	1	SEE TABLE 2	SEAT, Ø.050, PILL STYLE, Ø.200 X .100	ALUMINA-CERAMIC	NO
42	1	SEE TABLE 2	GUIDE RING, STEM, BOTTOM, SURFACE HTV	PTFE	NO
43	1	SEE TABLE 2	PIN HOLDER, HTV	NITRONIC 50 HS	NO
44	1	SEE TABLE 3	SPRING, COIL, HPS	ELGILOY	NO
45	8	SEE TABLE 4	SHCS, M12 X 1.75 X 40	SEE TABLE	YES
46	1	SEE TABLE 5	HANDLE, SURFACE HTV	316 SS	NO
47	1	SEE TABLE 5	BUSHING, STEM, SURFACE HTV	NI-AL-BRZ	YES
48	1	SEE TABLE 5	BOLT, SHOULDER, Ø4MM X 12MM LG, M3X0.5	18-8 SS	NO
49	1	SEE TABLE 5	SHSS, M4X.07X3LG, FLAT POINT	18-8 SS	NO

TABLE 1: SEAL SELECTION

ITEM	EPDM	FFKM	DESCRIPTION
31	71001738	71006901	SL, O-RING, 2-010
32	71006952	71001744	SL, O-RING, 2-011
33	71001748	71001752	SL, O-RING, 2-013
34	71001766	71001769	SL, O-RING, 2-018
35	71007240	71006260	SL, O-RING, 2-021
36	71005377	71005574	SL, O-RING, 2-030
37	71006912	71001820	SL, O-RING, 3-906
38	71006954	71006953	SL, O-RING, M5 X 1

TABLE 2: FLOW RATE RANGE SELECTION

ITEM	1-600gpd	50-2500gpd	DESCRIPTION
39	30415	30514	STEM, SURFACE, HTV
40	30428	30831	GATE, COATED, SURFACE HTV
41	30470	30516	SEAT, PILL STYLE
42	30828	30826	GUIDE RING, STEM, BOTTOM, SURFACE HTV
43	30955	30959	PIN HOLDER, HTV

TABLE 3: HPS SPRING SELECTION

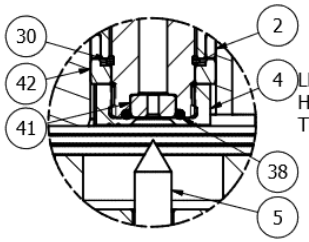
ITEM	LIGHT (L)	HEAVY (H)	DESCRIPTION
44	71007251	71007028	SPRING, COIL, HPS

TABLE 4: FASTENER SELECTION

ITEM	A4-70	SUPER DUPLEX 2507	DESCRIPTION
45	71005549	71007410	SHCS, M12 X 1.75 40

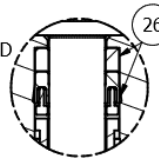
TABLE 5: ACTUATION SELECTION

ITEM	MANUAL	ROTORK	SF3	DESCRIPTION
46	30435	30944	30991	HANDLE, SURFACE HTV
47	30427	31169		BUSHING, STEM, SURFACE HTV
48	71007037	71007247		FASTENER, HANDLE
49	N/A	71007417		SHSS, M4x.07x3LG, FLAT POINT

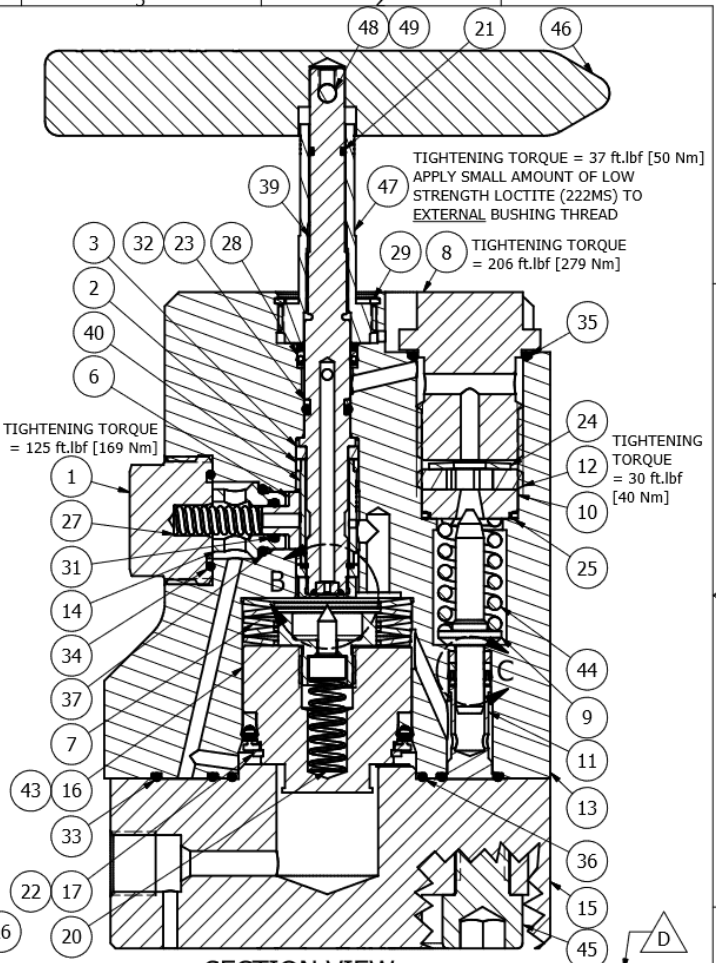


DETAIL B

LEFT HAND THREAD



DETAIL C



SECTION VIEW

(SF10000HTVA-600D-XXXX-X-XX-MA SHOWN)

NOTES CONTINUED:

7) COAT ALL THREADS WITH DYNATEX ANTI-SEIZE & LUBRICATING COMPOUND (OR SIMILAR) UNLESS OTHERWISE STATED

8) LUBRICATE ALL SEALS WITH PARKER SLUBE 884-4 (OR SIMILAR)

9) SEE O&M OR SF10000HTVA-SK FOR SPARES KITS PART LISTS

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED	DRAWN	J.MOORE	2/12/2019
	ENG1	N.ALLEY	2/12/2019
DRAWING PER ANSI Y14.5M-2009	ENG2	J.DUSHLETTA	2/12/2019
	OTHER		

FRACTIONS ± 1/16 | X ± .03 | .XX ± .010 | .XXX ± .005 | .XXXX ± .0005 | ANGULAR ±3°

UNLESS SPECIFIED DEBURR & BREAK EDGES .005/.005 Ra SURFACE DUAL: 63 FILLETS: R.028/.008 DRILL POINT: 110-150°

THIS DOCUMENT CONTAINS INFORMATION WHICH IS PROPRIETARY TO SKOFLO INDUSTRIES INC. THE INFORMATION CONTAINED HEREIN SHALL NOT BE DISCLOSED, DUPLICATED, USED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS DOCUMENT.

skoflo SKOFLO INDUSTRIES, INC. WOODINVILLE, WA

VALVE ASSEMBLY, SURFACE, SF10000HTVA, MANUAL

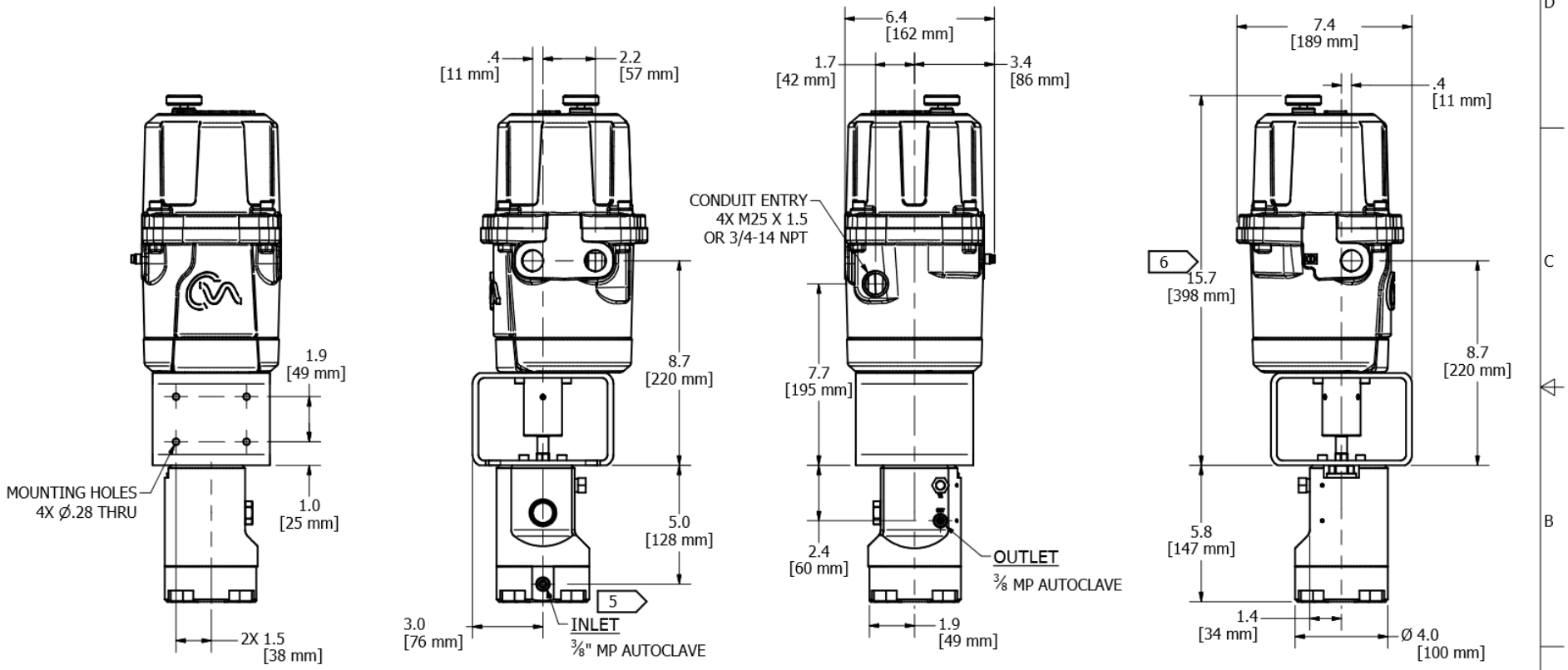
BOM DRAWING

DWG NO SF10000HTVA-MA REV D

SIZE B SCALE NONE SHEET 2 OF 2

SF10000HTVA-AT

REVISION HISTORY							
ECN #	REV	DESCRIPTION	DATE	DRAWN	ENG1	ENG2	OTHER
	A	INITIAL RELEASE	7/16/20	CA	JM	NA	

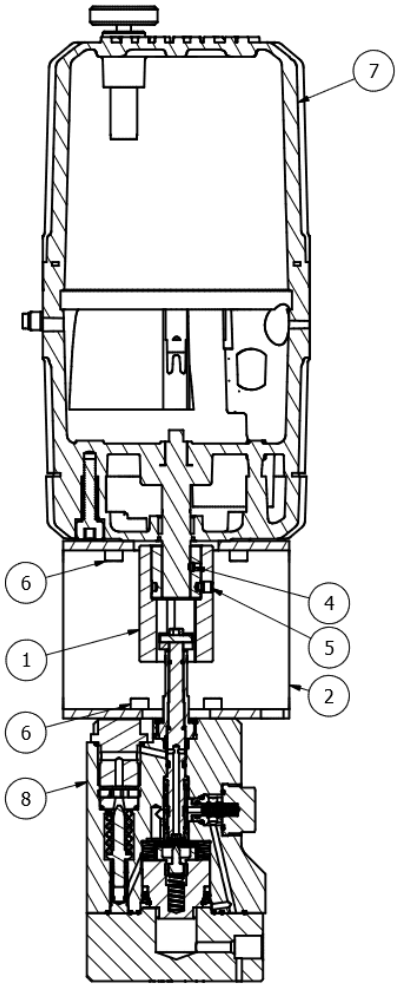


NOTES:
1) NOMINAL WEIGHT = 48.3 lb [21.9 kg]
2) RATED WORKING PRESSURE = 10,000 PSI [689 bar]
3) PROOF TEST PRESSURE = 15,000 PSI [1034 bar]
4) FLOW RATE RANGES:
   a) 1-600 gpd
   b) 50-2500 gpd

5 ORIENTATION CAN BE ADJUSTED IN 90° INCREMENTS
6 ALLOW ADDITIONAL 5.6 [150 mm] FOR COVER REMOVAL

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED	DRAWN C.ARNOLD 7/7/2020	skoflo	SKOFLO INDUSTRIES, INC. WOODINVILLE, WA
DRAWING PER ANSI Y14.5M-2009	ENG1 J.MOORE 7/15/2020	VALVE ASSEMBLY, SURFACE, SF10000HTVA, ROTORK ACTUATED ENVELOPE DRAWING	
FRACTIONS ± 1/16 .X ± .03 .XX ± .010 .XXX ± .005 ANGULAR ±3°	UNLESS SPECIFIED DEBURR & BREAK EDGES .015/.005 Ra SURF QUAL: 63 FILLETS: R.02/.008 DRILL POINT: 110-150°	ENG2 N.ALLEY 7/15/2020	DWG NO SF10000HTVA-AT REV A
	OTHER	THIS DOCUMENT CONTAINS INFORMATION WHICH IS PROPRIETARY TO SKOFLO INDUSTRIES INC. THE INFORMATION CONTAINED HEREIN SHALL NOT BE DISCLOSED, DUPLICATED, USED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS DOCUMENT	SIZE B SCALE NONE SHEET 1 OF 2

SF10000HTVA-AT



SECTION A-A

PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	PRESSURE CONTAINING
1	1	26540	COUPLER, ACTUATOR, SQUARE DRIVE	NITRONIC 50 HS	NO
2	1	27430	BRACKET, ACTUATOR, BPR10000C/ 15000B	316L SS	NO
3	1	30802	SLEEVE, ADAPTER, ACTUATOR	316L SS	NO
4	1	71002911	SHSS, CUP, 10-32 X 1/8	316 SS	NO
5	3	71005731	STSC, HALF DOG POINT, M6 X 1 - 6h X 8	304 SS	NO
6	8	71007246	SHCS, M6X1 X 12LG	316 SS	NO
7	1	SEE DWG 71007126	ACTUATOR, ROTARY, CMR-200	ASSEMBLY	NO
8	1	SEE DWG SF10000HTVA-MA	SUBASSEMBLY, SF10000HTVA, ROTORK ACTUATED	SEE DWG SF10000HTVA-MA	YES

CONFIGURATION NUMBER GUIDE

SF5000HTVA	-	XXXX	-	XXXX	-	X	-	XX	-	AT	-	XX	-	X	-	X	-	XX
1-600gpd		600D		FFKM		L	LIGHT			120 VAC		120		M25 X 1.5		M		AX	ATEX
50-2500gpd		2500D		EPDM		H	HEAVY			208 VAC		208		3/4 - 14 NPT		N		EX	IECEx
FLOW RANGE		FLOW CODE		SEAL MATERIAL		SPRING CODE	SPRING			230 VAC		230		CONDUIT ENTRY SIZE		CONDUIT CODE		NA	FM
										24 VDC		DC						GO	GOST
										VOLTAGE		VOLTAGE CODE						HAZLOC CODE	HAZLOC CERTIFICATION

FASTENER CODE	FASTENER MATERIAL
A4	A4-70
SD	SUPER DUPLEX

PROTOCOL CODE	COM. PROTOCOL
4	4-20mA
F	FIELD BUS
H	HART

NOTES CONTINUED:
7) COAT ALL THREADS WITH DYNATEX ANTI-SEIZE & LUBRICATING COMPOUND (OR SIMILAR) UNLESS OTHERWISE STATED
8) LUBRICATE ALL SEALS WITH PARKER SLUBE 884-4 (OR SIMIALR)
9) SEE O&M OR SF10000HTVA-SK FOR SPARES KITS PART LISTS.

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED
DRAWING PER ANSI Y14.5M-2009
FRACTIONS ± 1/16
X ± .03
.XX ± .010
.XXX ± .005
.XXXX ±.0005
ANGULAR ±3°
UNLESS SPECIFIED
DEBURR & BREAK EDGES .015/.005
Ra SURF QUAL: 63
FILLETS: R.020/.008
DRILL POINT: 110-150°

DRAWN C.ARNOLD 7/7/2020
ENG1 J.MOORE 7/15/2020
ENG2 N.ALLEY 7/15/2020
OTHER

SKOFLO INDUSTRIES, INC.
WOODINVILLE, WA

VALVE ASSEMBLY, SURFACE, SF10000HTVA, ROTORK ACTUATED
BOM DRAWING

DWG NO SF10000HTVA-AT REV A
SIZE B SCALE NONE SHEET 2 OF 2

SkoFlo Industries
14241 NE 200th Street
Woodinville, WA 98072 USA
Tel 1-425-485-7816
Fax 1-425-368-1696

www.SkoFlo.com